

A STUDY TO ESTIMATE JUVENILE SALMONID SURVIVAL THROUGH THE LOWER COLUMBIA RIVER AND ESTUARY USING ACOUSTIC TAGS, 2008

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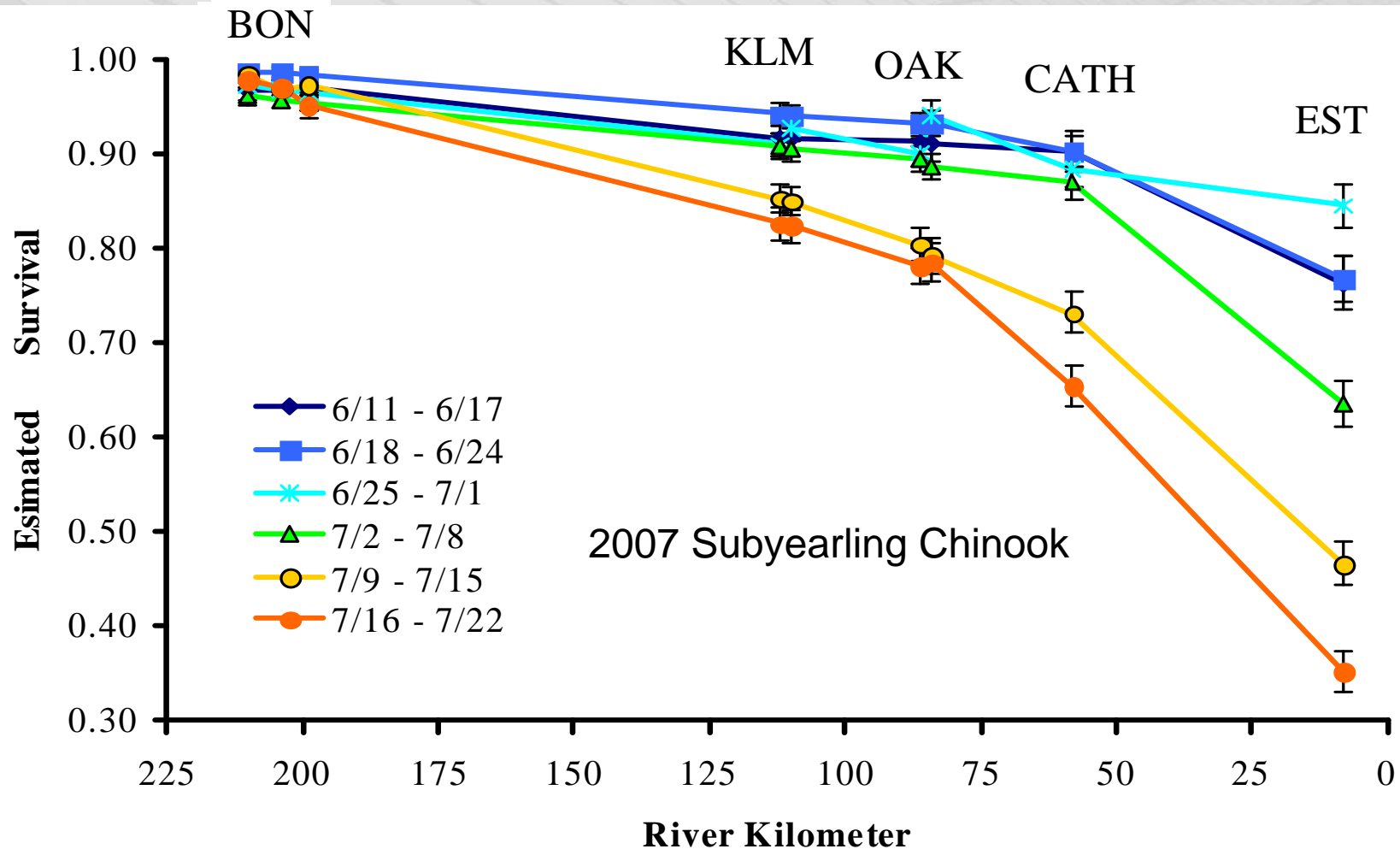
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Background - Review of info to date – 2005-2007



2008 Objectives

- ▶ Estimate Survival from Bonneville Dam tailrace to the mouth of the Columbia River
 - Partition Survival in Columbia River reaches downstream of Bonneville Dam
 - Yearling Chinook salmon
 - Subyearling Chinook salmon
- ▶ Examine effects of FCRPS passage history on mortality downstream of Bonneville Dam
- ▶ Determine Migration Pathways/Habitat associations in Estuary
- ▶ Determine fate of fish that cease migration (McComas)

Fish Releases

- ▶ JSATS-tagged fish were released in the Bonneville Dam Corner Collector and in the tailrace (by boat)

- For these analyses;
 - Yearlings grouped into 5-d blocks
 - Subyearlings grouped into 4-d blocks
 - C...



am

Run Type	Release Date	N
Yearling	4/30 - 5/4	238
	5/5 - 5/9	238
	5/10 - 5/14	242
	5/15 - 5/19	208
	5/20 - 5/24	294
	5/25 - 5/29	246
	5/30 - 6/3	186
	Total	1652
Subyearling	6/15 - 6/18	224
	6/19 - 6/22	240
	6/23 - 6/26	239
	6/27 - 6/30	241
	7/1 - 7/4	240
	7/5 - 7/8	240
	7/9 - 7/12	240
	7/13 - 7/16	227
7/17 - 7/20	149	
	Total	2040

Array Locations



2008 JSATS Array Locations Lower Columbia River

In 2008 the JSATS (Juvenile Salmon Acoustic Telemetry System) will be used to examine survival and behavior of yearling and sub-yearling Chinook salmon between Bonneville Dam and the Pacific Ocean. This collaborative study by the Pacific Northwest National Laboratory and NOAA Fisheries addresses information gaps related to the passage of juvenile salmonids through the Federal Columbia River Power System.

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Contact:
Blaine Ebberts, at USACE (blaine.d.ebberts@usa.army.mil) or
Geoff McInnes at PNWL (geoffrey.mcinnis@pnw.gov) for more information.

● Node location and identifier □ Town or city

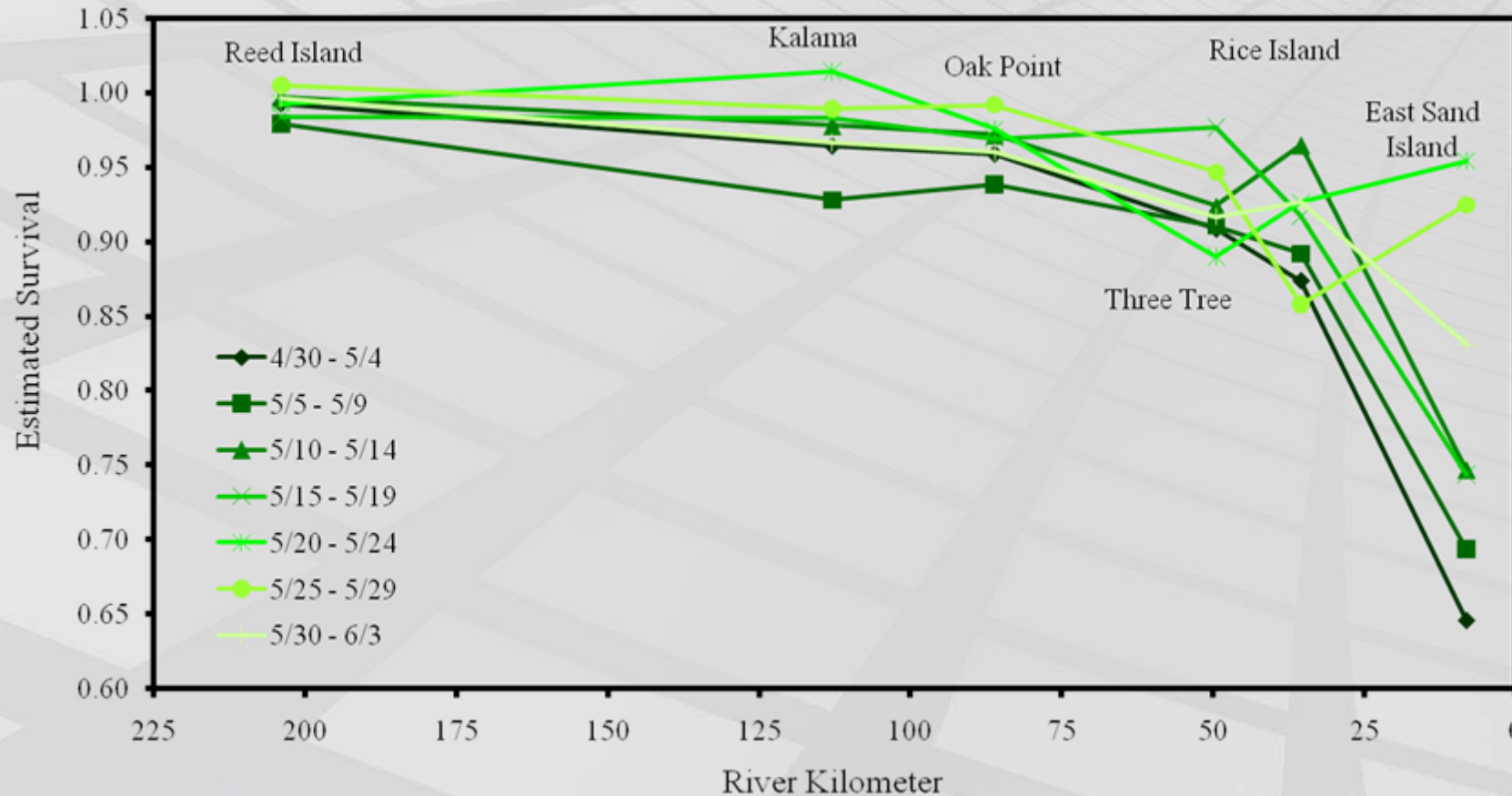


0 2 4 6 8
Kilometers

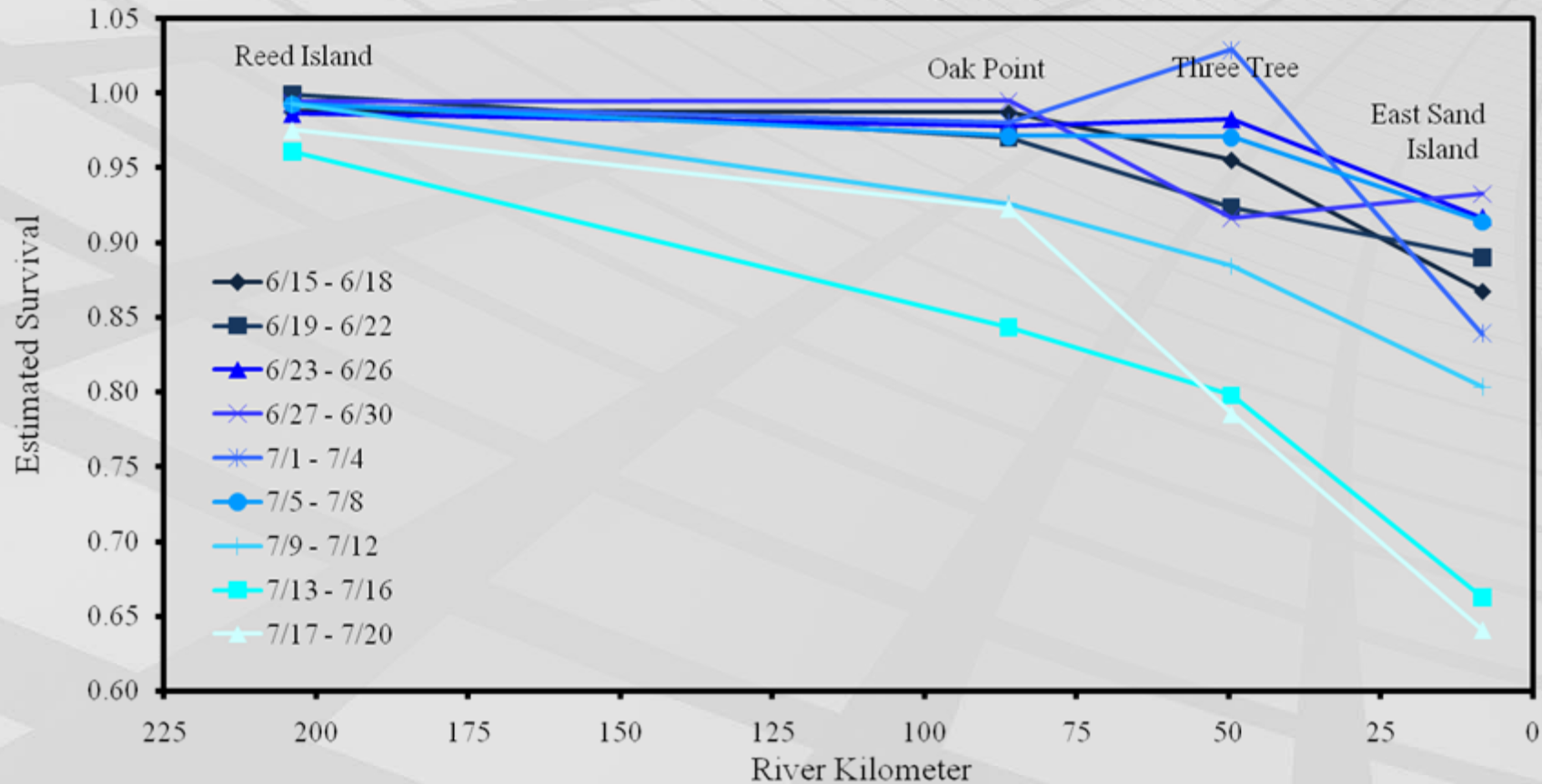
Pacific Northwest
National Laboratory
ORNL-6800-0001



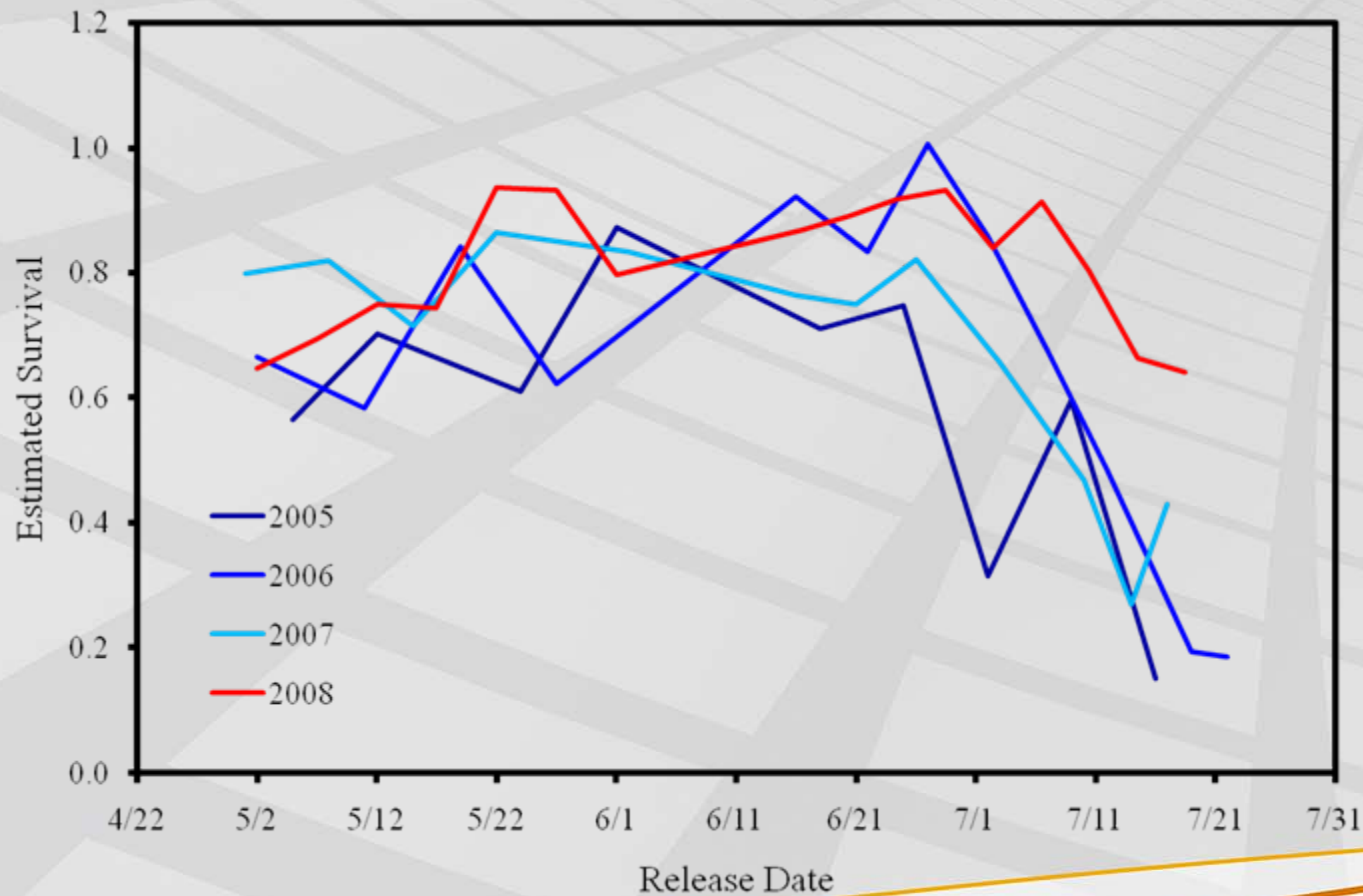
Yearling Chinook salmon survival was lowest in the final 35 km of Columbia River/Estuary



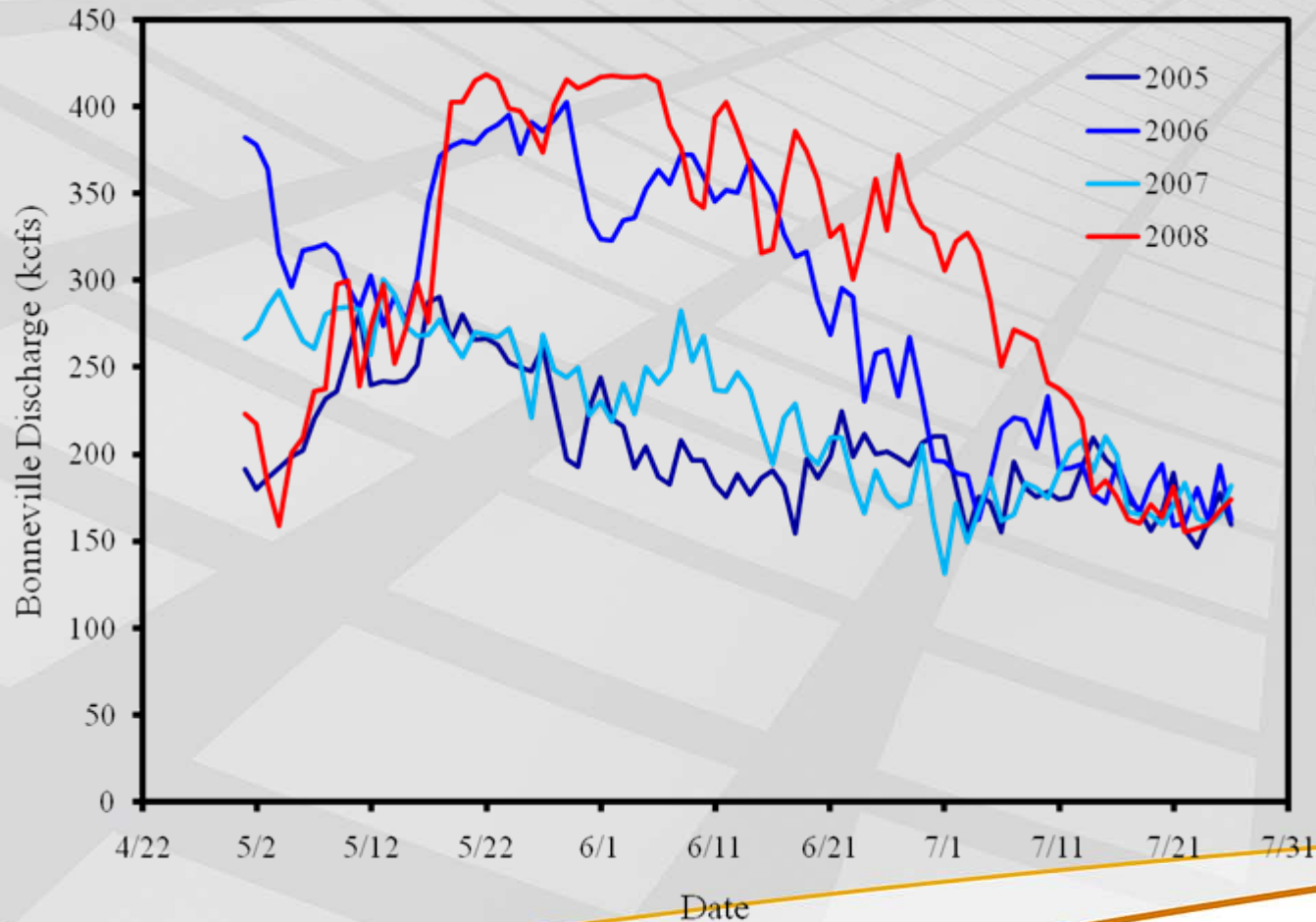
Subyearling Chinook salmon survival was lower after July 12 and in lower 50 km, but...



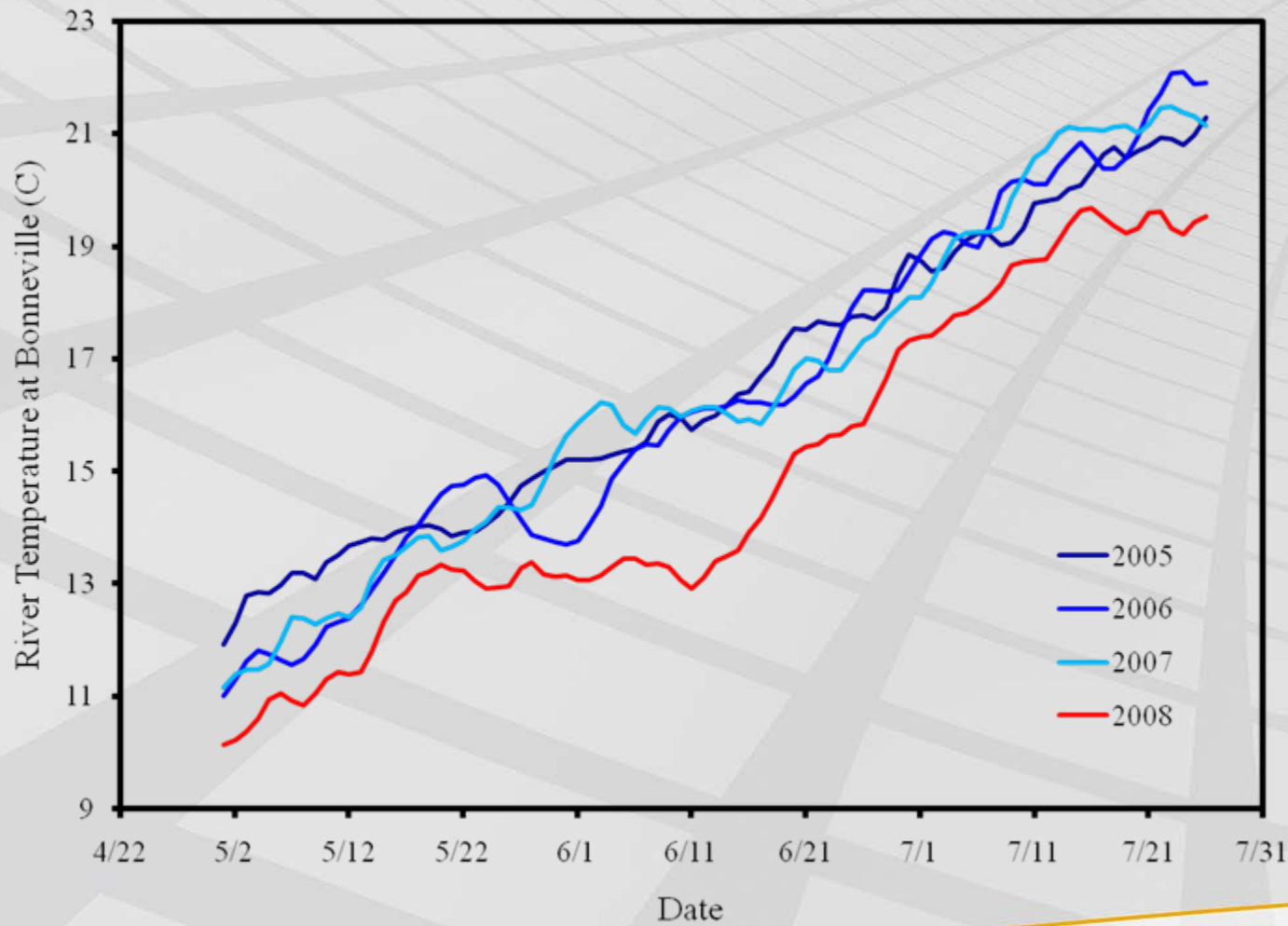
Subyearling Chinook survival to Rkm 8 was higher later in the season in 2008 than in previous 3 years



Discharge was higher early – and similar later in 2008 subyearling emigration season

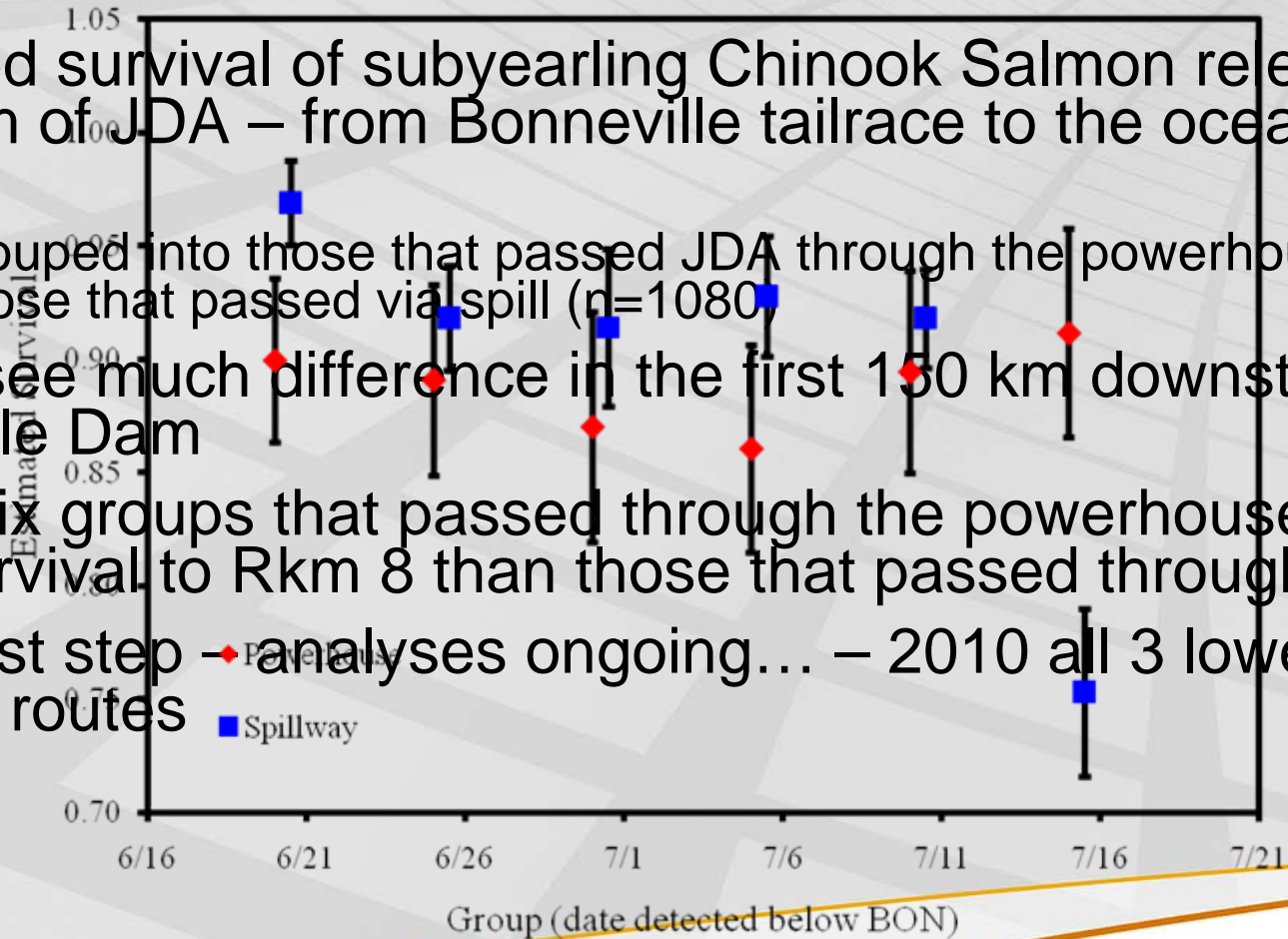


Water temperature was lower in 2008



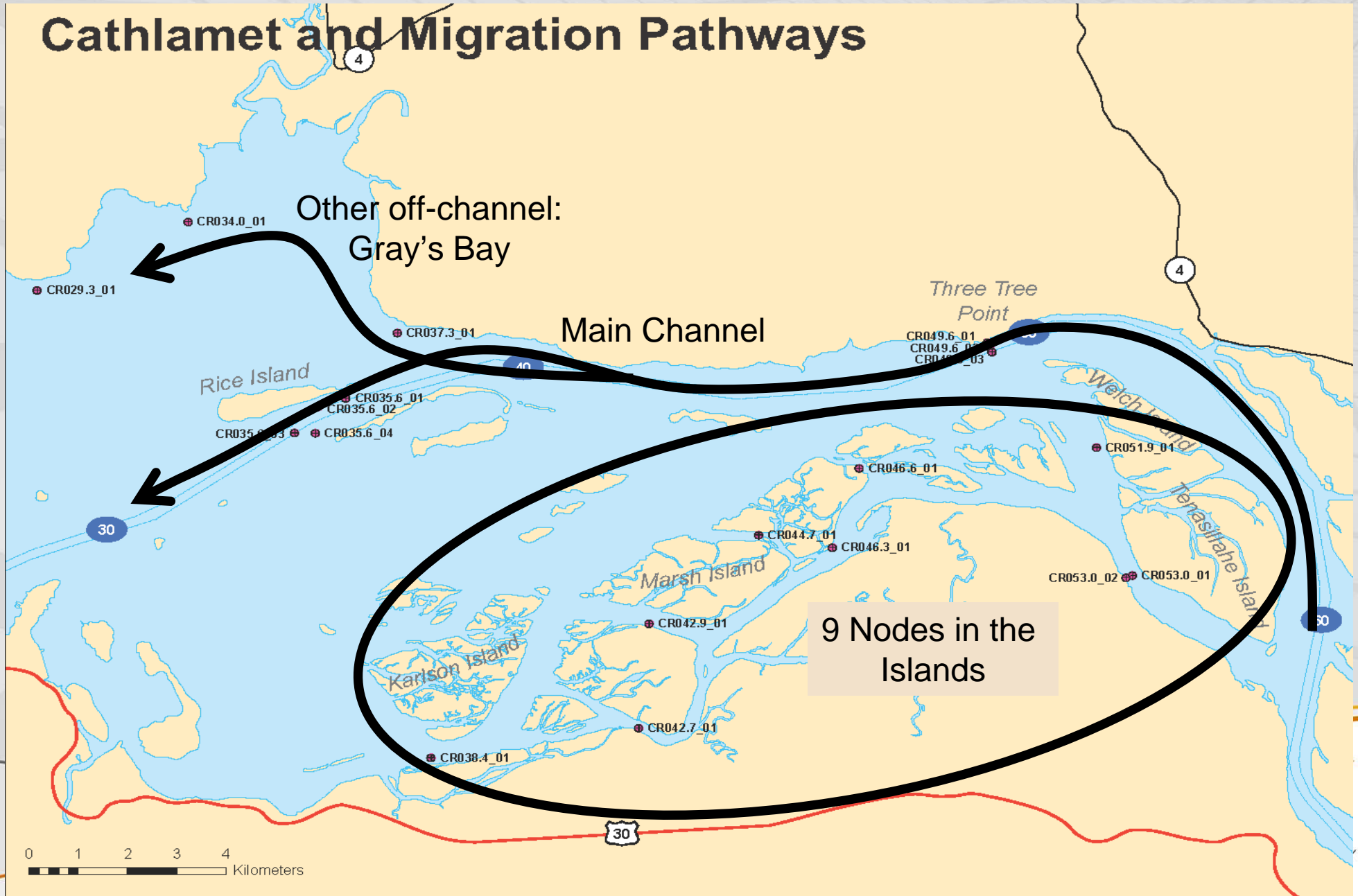
FCRPS – passage route specific mortality in subyearling Chinook salmon – the beginning..

- ▶ Estimated survival of subyearling Chinook Salmon released upstream of JDA – from Bonneville tailrace to the ocean (Rkm 8.3)
 - fish grouped into those that passed JDA through the powerhouse (n=462) and those that passed via spill (n=1080)
- ▶ Did not see much difference in the first 150 km downstream of Bonneville Dam
- ▶ Five of six groups that passed through the powerhouse had lower survival to Rkm 8 than those that passed through spillway
- ▶ Just a first step – analyses ongoing... – 2010 all 3 lower dams/all routes

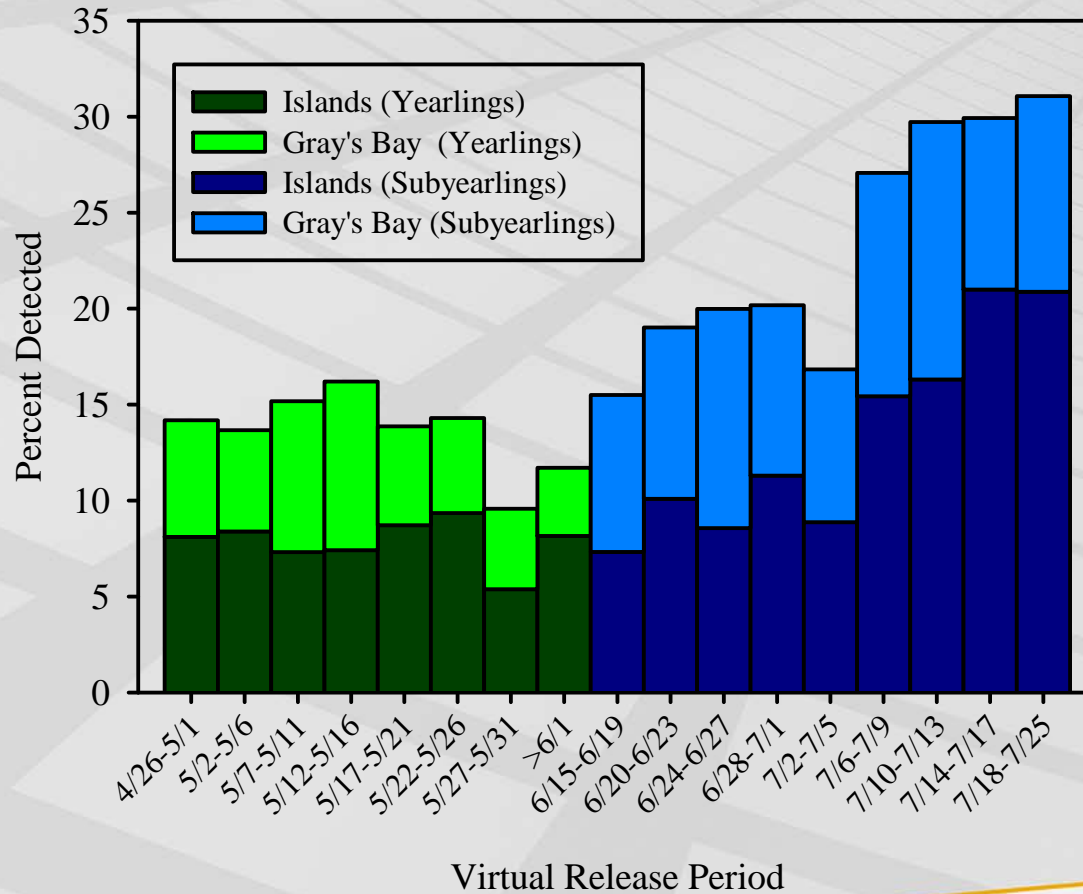


Migration Pathways

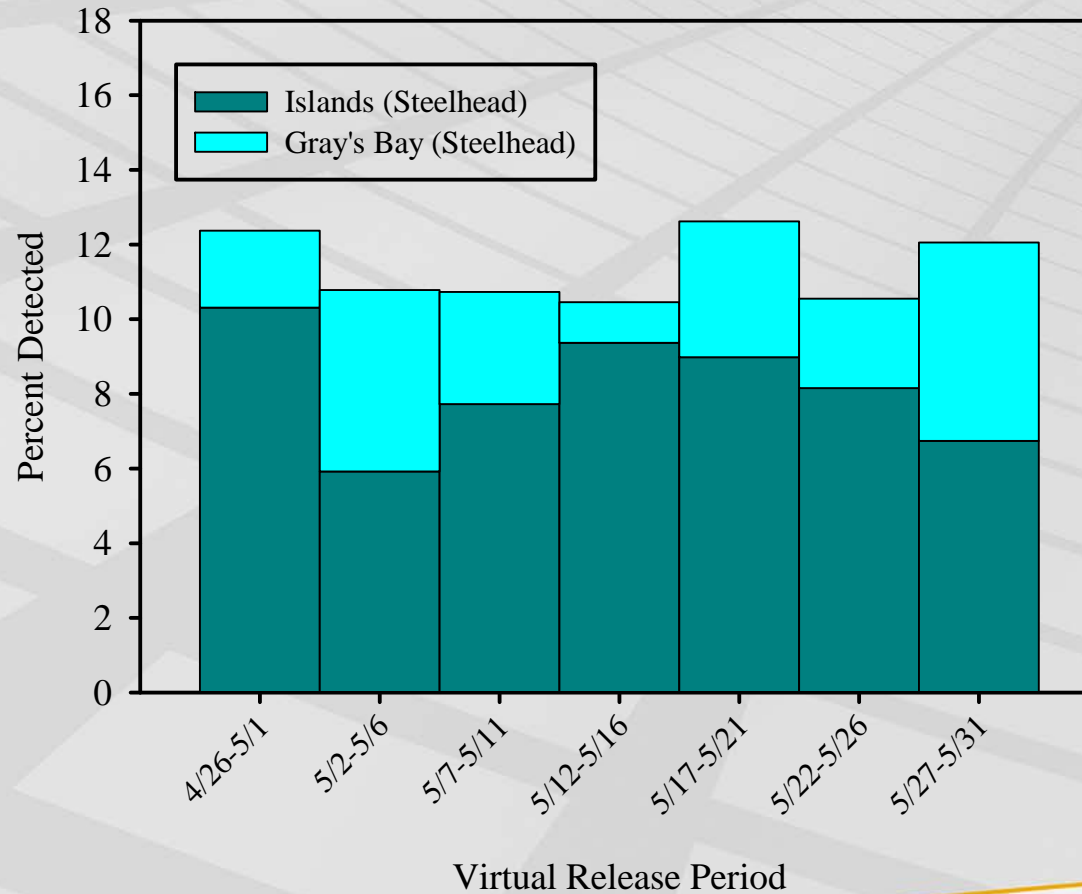
Cathlamet and Migration Pathways



Yearling and subyearling Chinook salmon used off-channel migration routes

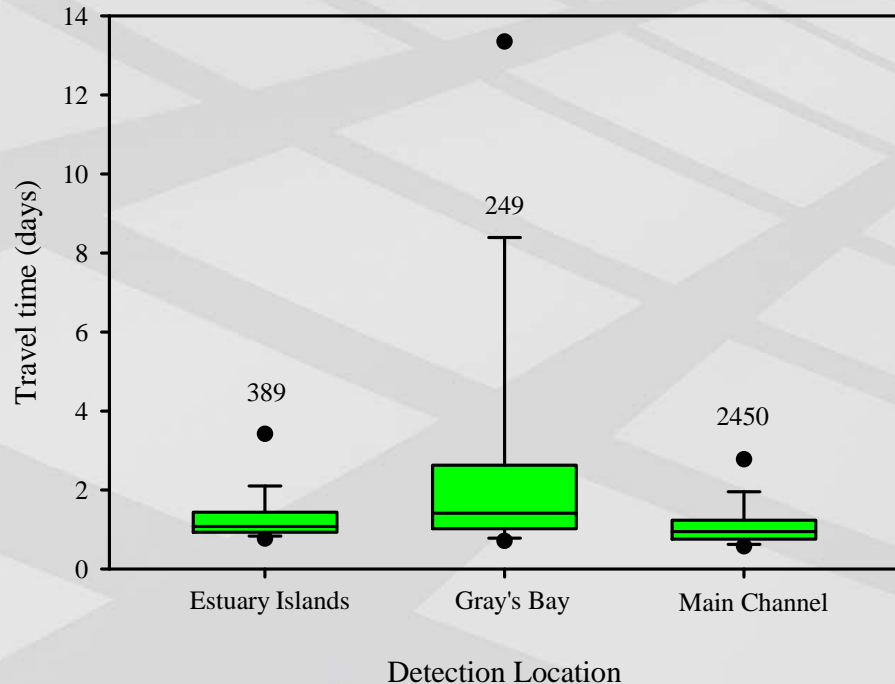


Steelhead used the islands more than other off-channel routes

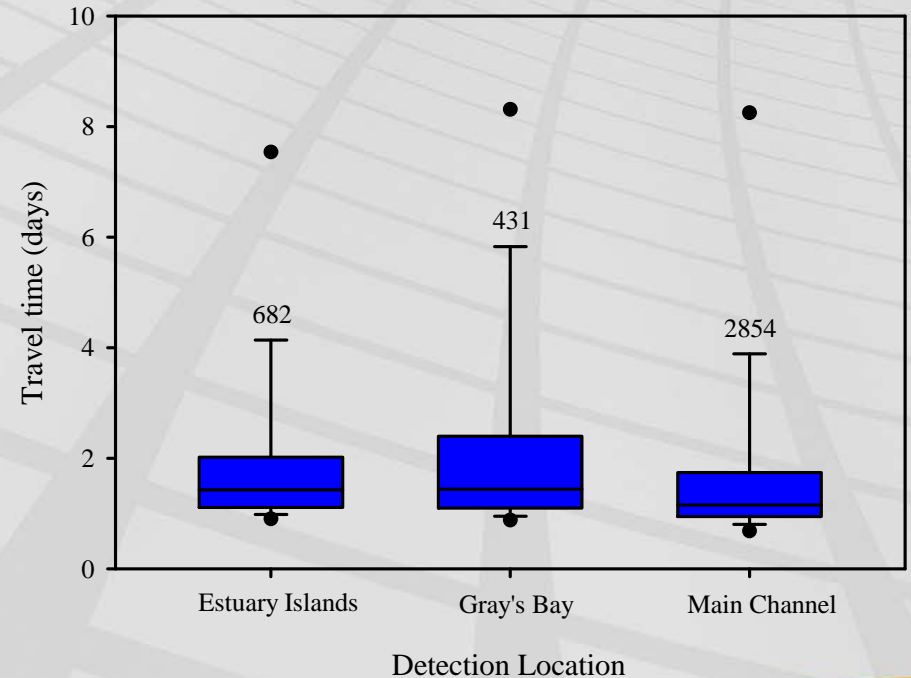


Travel time from ~Rkm 50 to East Sand Island (Rkm 8) was similar for all routes

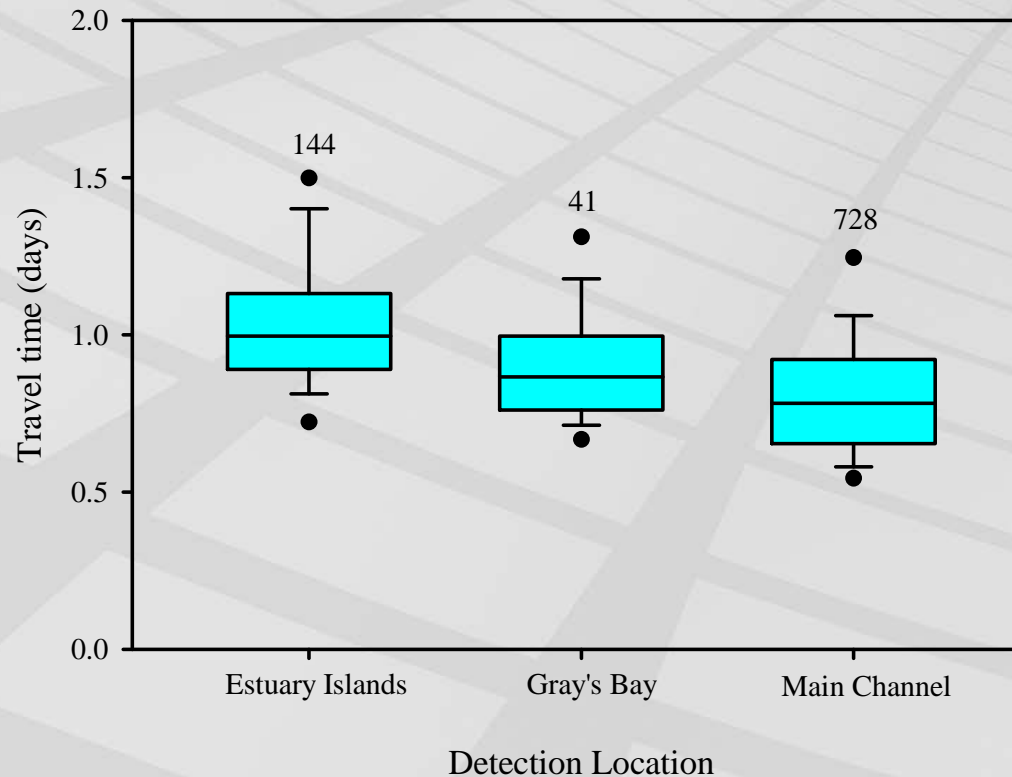
Yearling Chinook salmon



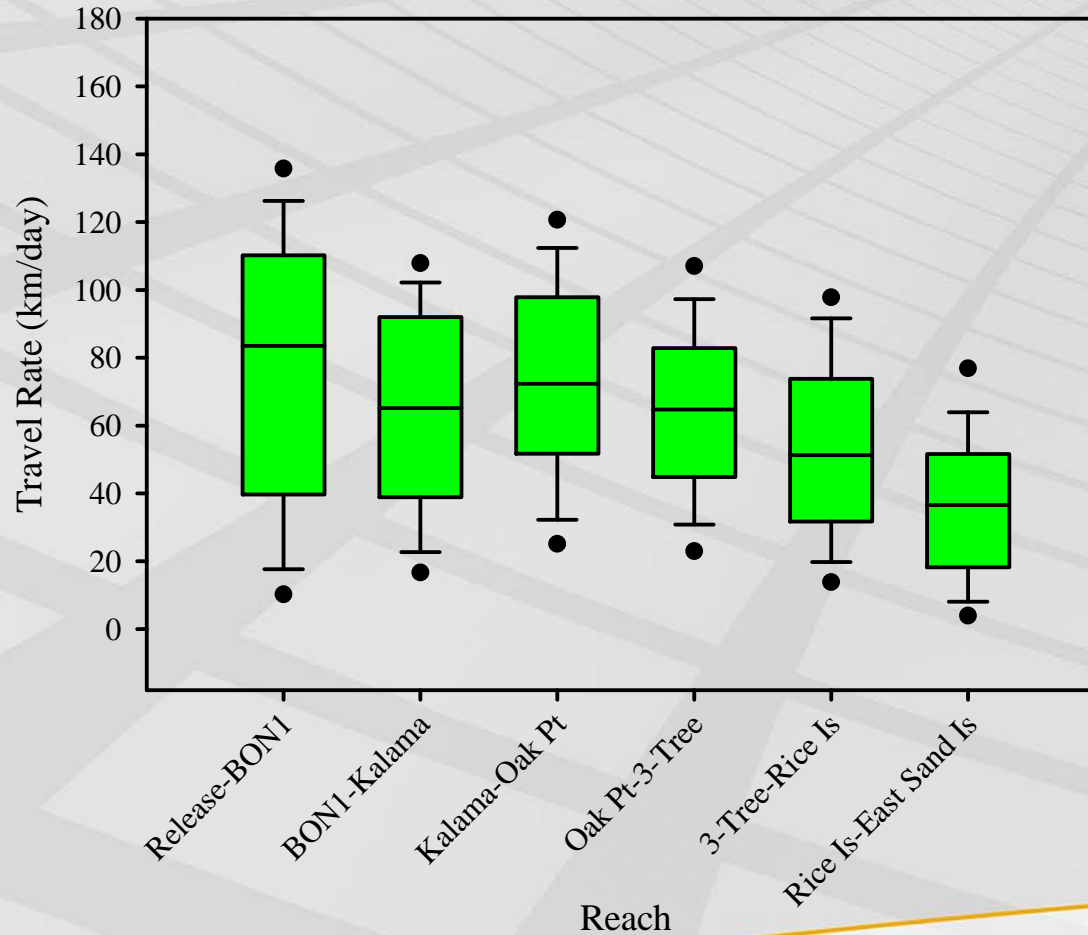
Subyearling Chinook salmon



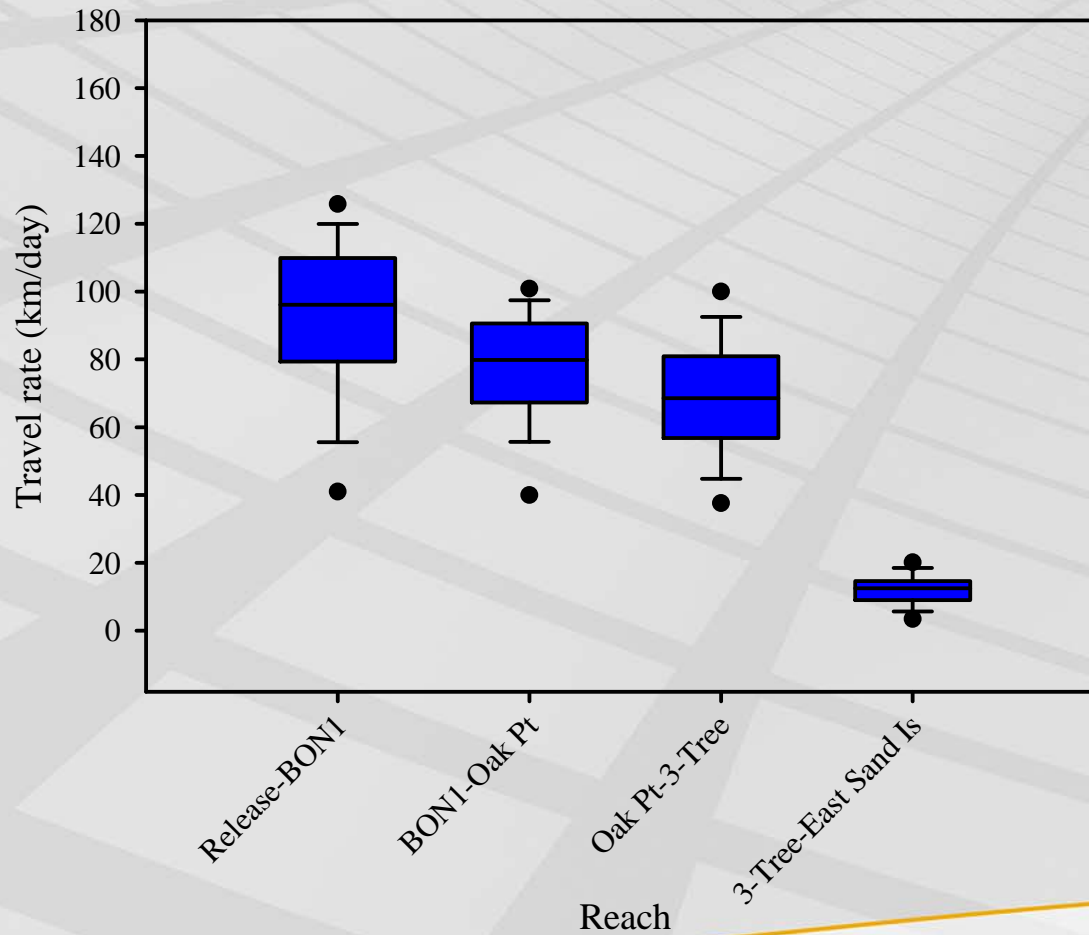
Travel time from ~ Rkm 50 to East Sand Island (Rkm 8) was similar for all routes for Steelhead



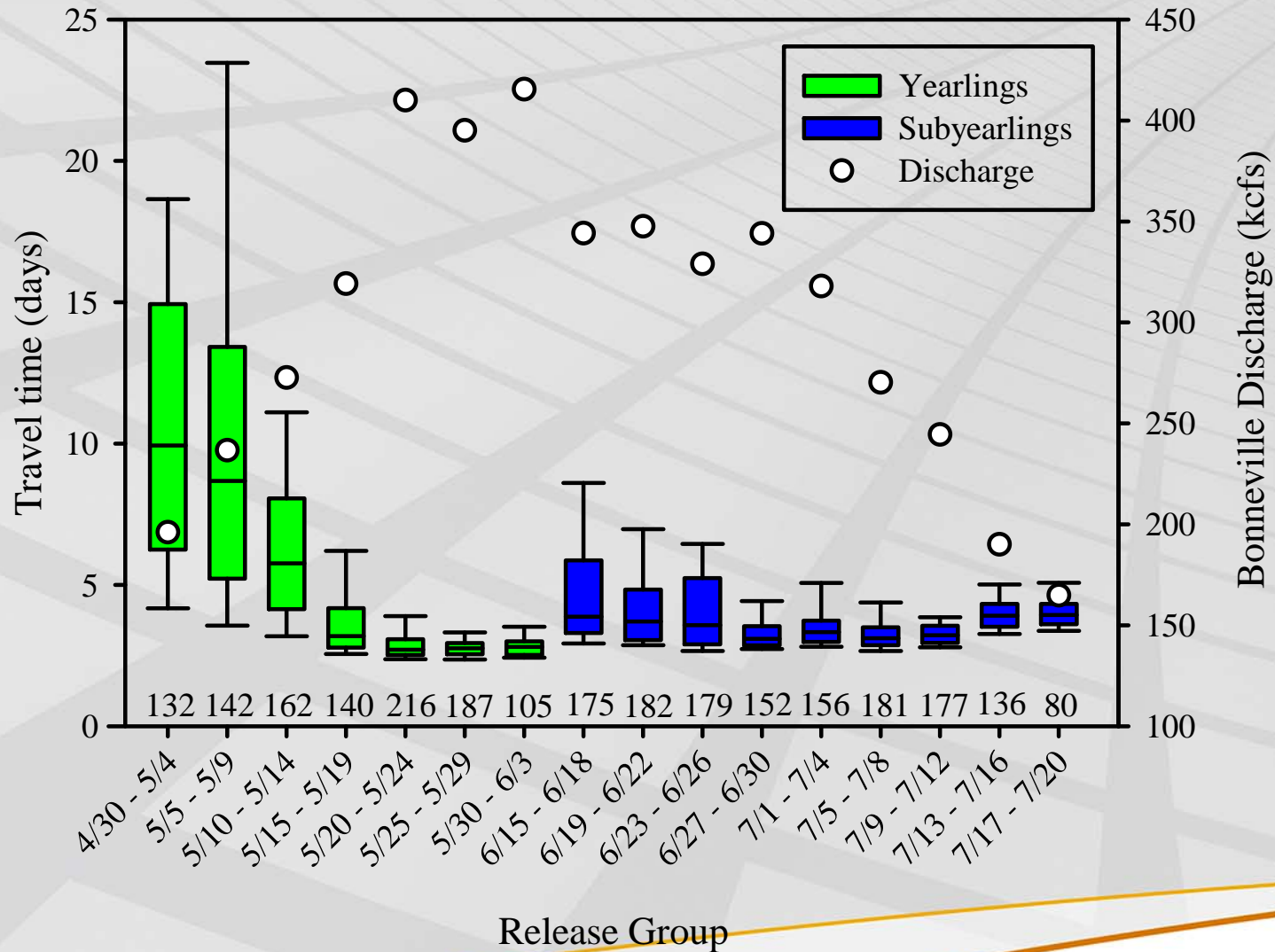
Yearling Chinook salmon travel rate decreased as fish approached the ocean



Subyearling Chinook salmon travel rate decreased as fish approached the ocean

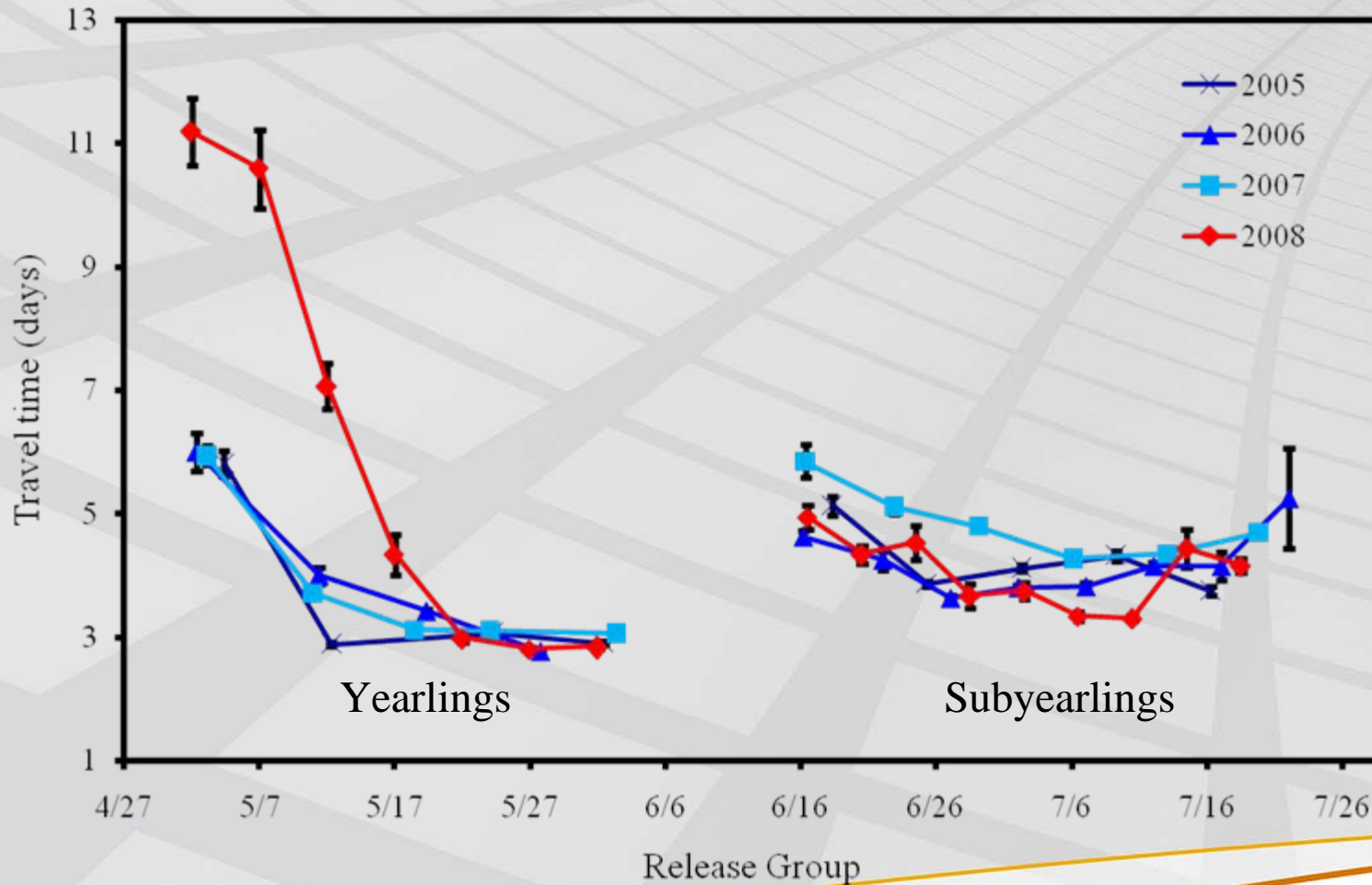


Travel time declined later in the emigration

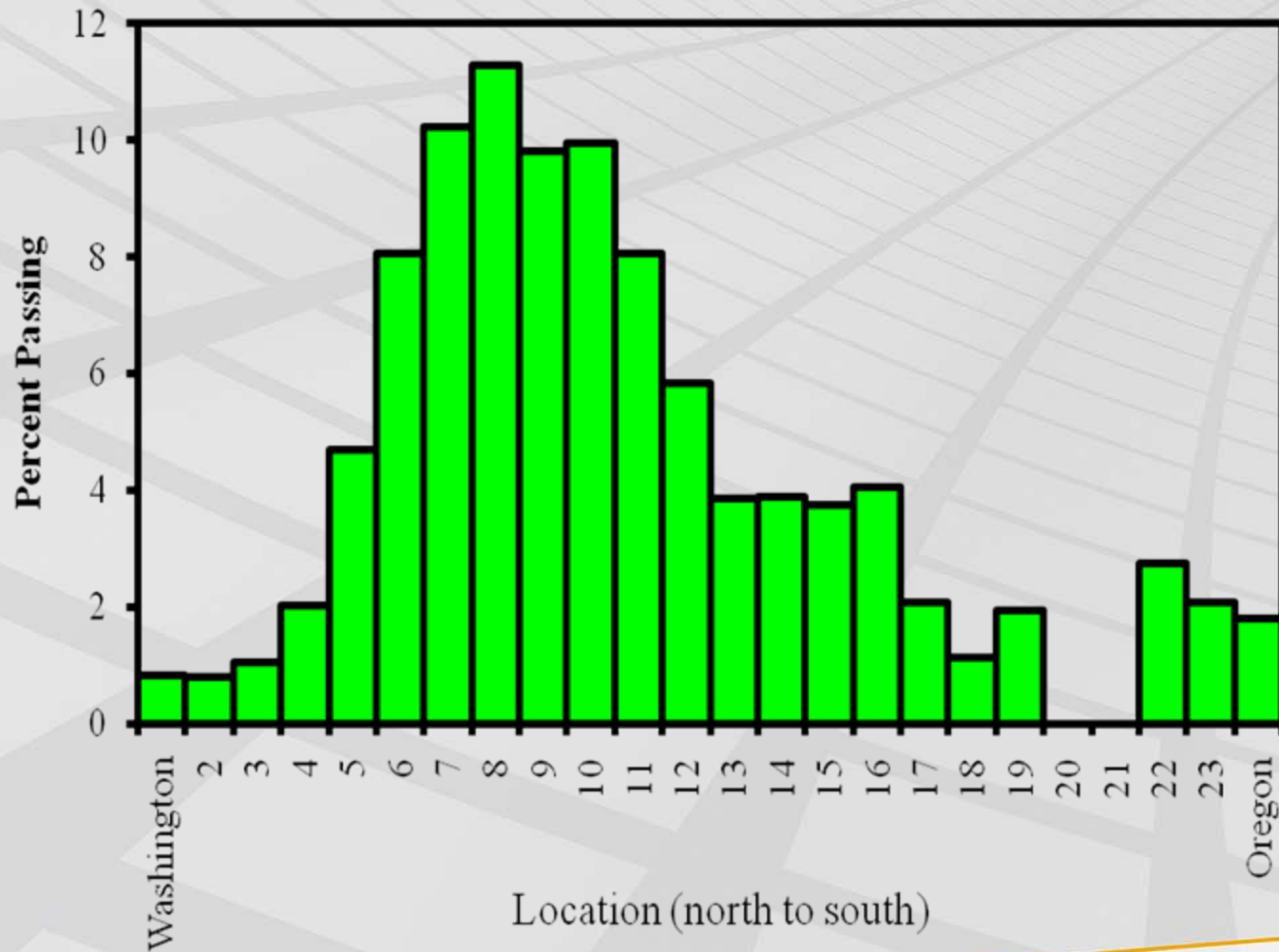


Bonneville Dam tailrace to East Sand Island

Travel time from BON to Rkm 8 was more variable in 2008



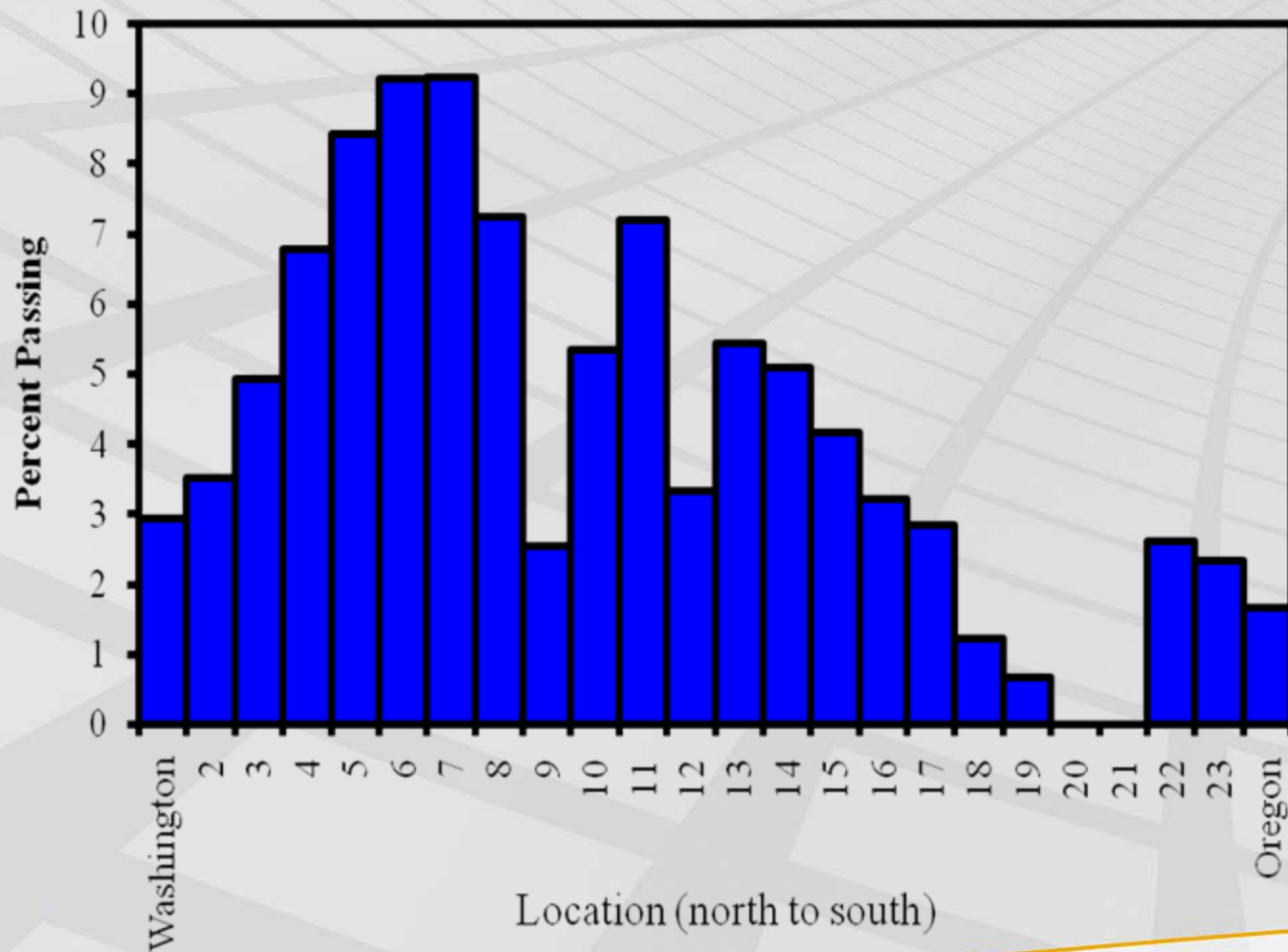
More yearling Chinook passed East Sand Island on the Washington side of the Navigation Channel



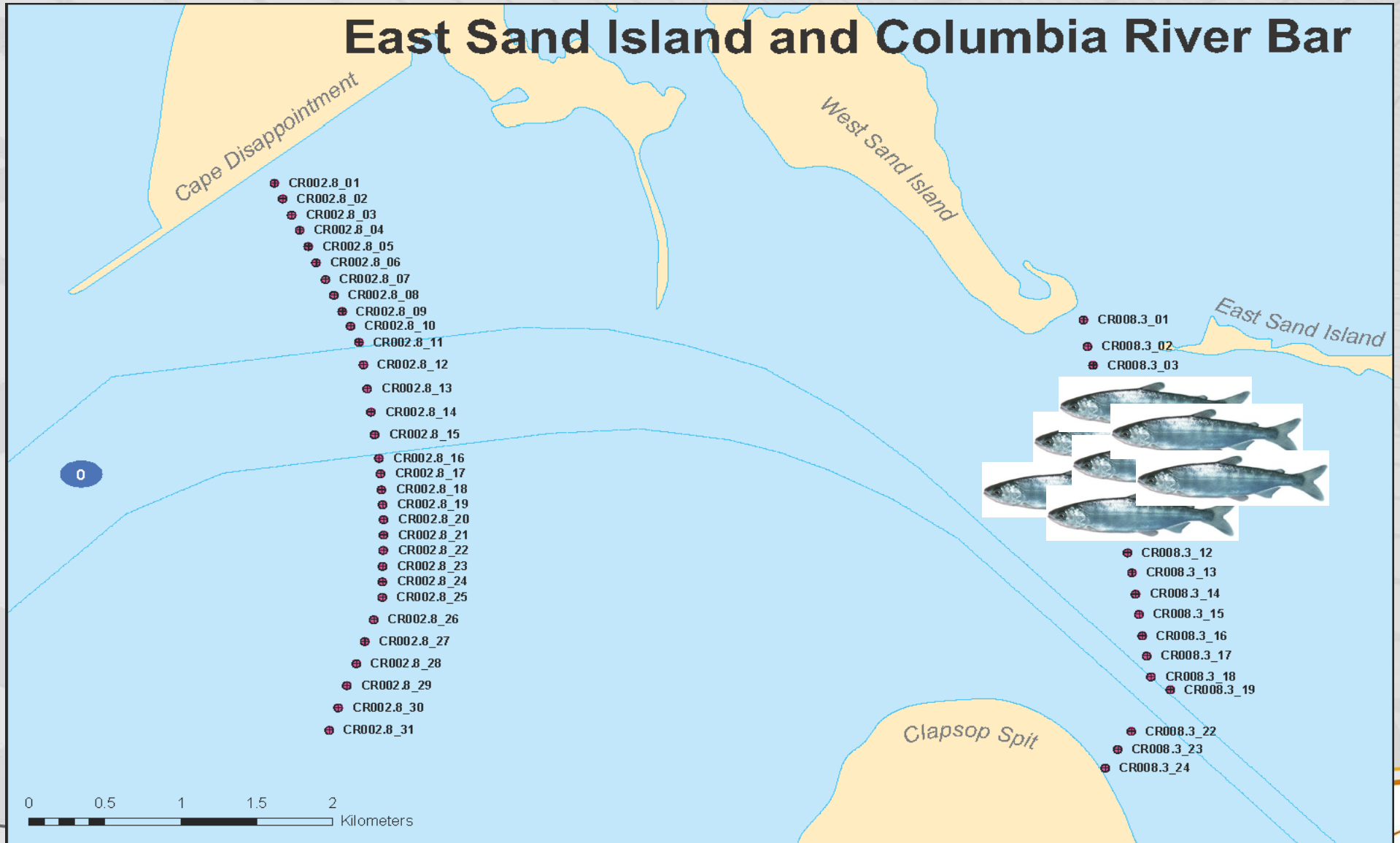
East Sand Island and Columbia River Bar



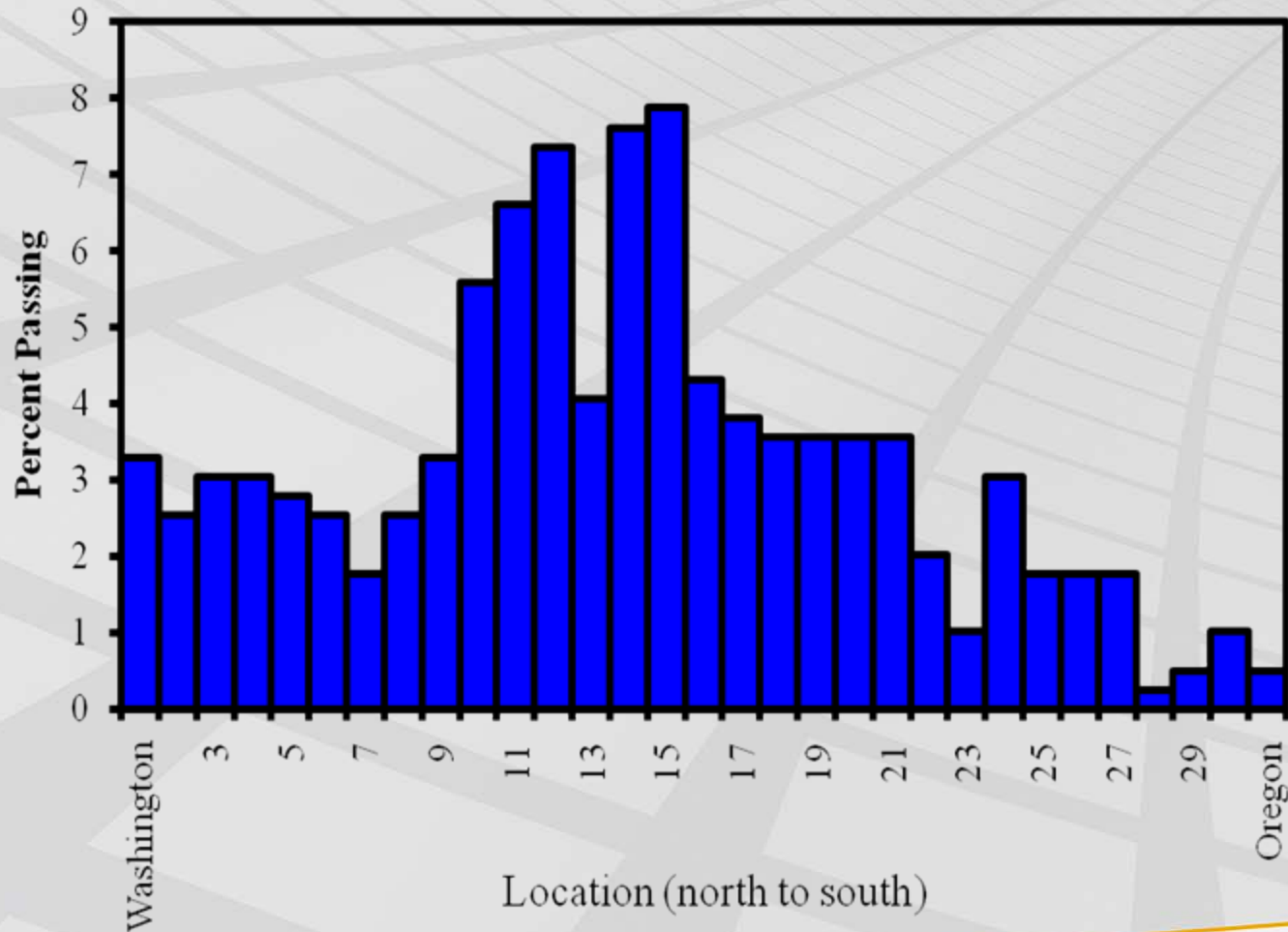
Also – more Subyearlings passed East Sand Island on the Washington side of the channel



East Sand Island and Columbia River Bar

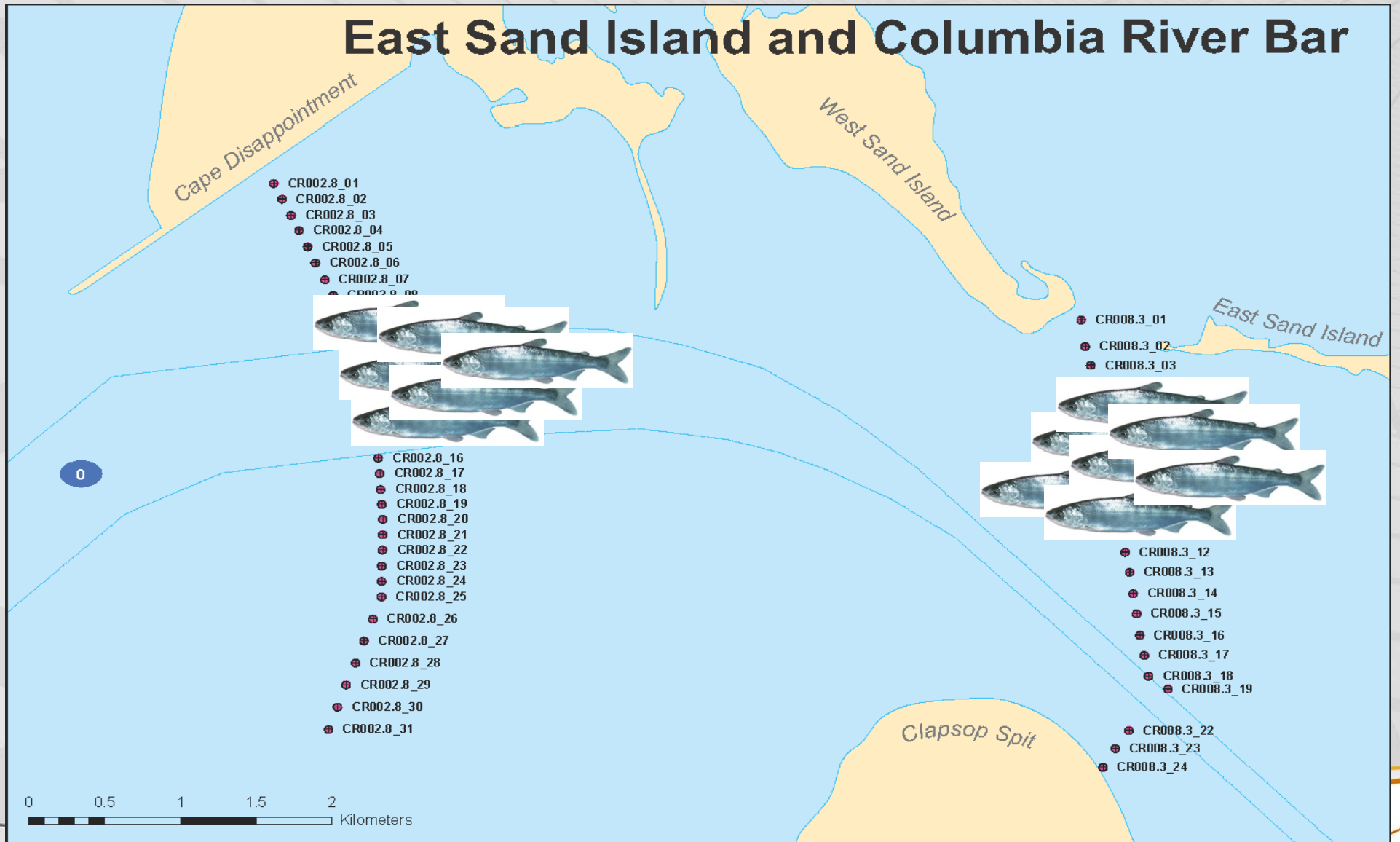


More subyearlings passed in the Navigation Channel on the CR Bar

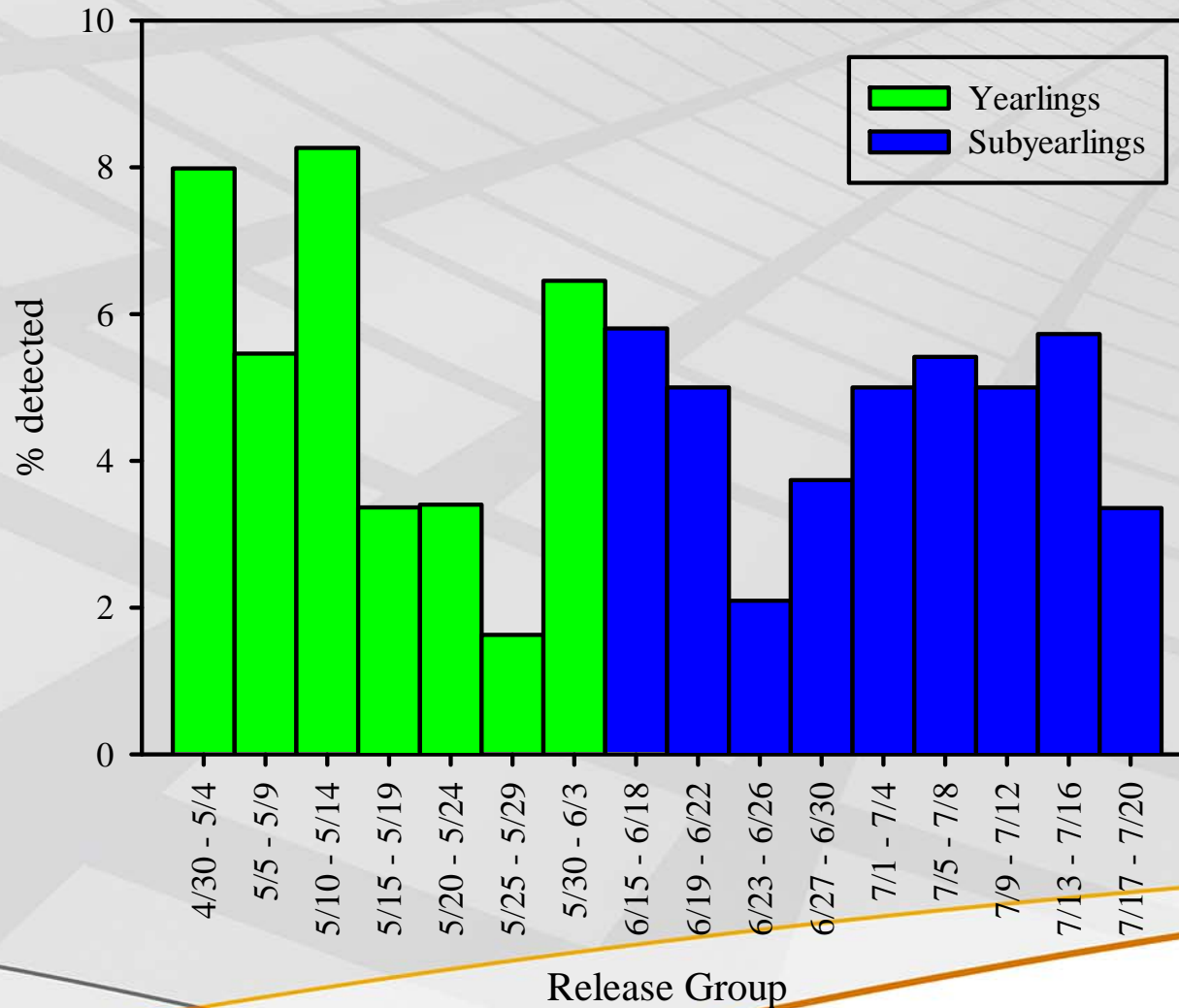


For time periods when nodes were deployed in the NAV channel

East Sand Island and Columbia River Bar



Similar proportions of PIT tags were detected on the bird islands



Conclusions

- ▶ Yearling and subyearling Chinook salmon survival was generally high between Bonneville Dam and Rkm 50 – except late subyearling groups
- ▶ Lowest reach survival was in the final 35 to 50 km
- ▶ Subyearling Chinook salmon survival was higher later in the emigration than in previous 3 years
- ▶ Travel time was more variable in 2008 than in previous years
- ▶ Chinook salmon and steelhead used side channel migration routes and travel time to MCR was similar among routes
- ▶ Cross channel distribution was skewed toward WA side of the navigation channel at Rkm 8– closer to the bird colonies
- ▶ Opportunistically used JSATS-tagged fish to begin to better understand effects of certain FCRPS passage histories on mortality in lower 230 km of the Columbia River – 2010 will realize potential

Acknowledgements

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